REMARKS

Examination of the foregoing response will not result in the introduction of new matter into the present application for invention. Therefore, the Applicant, respectfully, requests that the foregoing response be entered and the claims to the present application, kindly, be reconsidered.

The Final Office Action dated May 5, 2004 has been received and considered by the Applicants. Claims 1 through 20 are pending in the present application for invention. Claims 1 through 20 stand rejected by the May 5, 2004 Final Office Action.

The Examiner's response to Applicant' s arguments submitted in February 21, 2004 has been fully considered by the Applicant. The Examiner states that Claim 1 does not distinguish the nature of the first and second images, except for the different resolutions. The Applicant respectfully points out that the rejected Claim 1 to present invention clearly details to different images both of which images are initially at a first resolution. The first and second images as recited by Claim 1 are initially aligned at the first resolution. Based on the initial alignment, a second alignment approximation is derived based on the first image and the initially aligned second image with both the first and second images at a second resolution, different from the first resolution. The first and second images at the second resolution are aligned based on a combination of the first and second alignment approximations. The Examiner's position is that Frazier et al. (U.S. Patent No. 5,651,075) teach in FIG. 4B and FIG. 4c a first image with low resolution and second image with higher resolution. The Examiner further states that Frazier et al. teach edge enhancement and shadow reduction to get from the image shown in FIG. 4B to the image shown in FIG. 4c, and that the Examiner considers edge enhancement and shadow reduction equivalent to aligning as recited by the rejected clients. The Applicant respectfully points out that the rejected claims recite aligning and that aligning is not equivalent to edge enhancement, or shadow reduction, or any combination thereof. The specification to the present invention clearly describes the alignment of two images. Particularly, on page 7, beginning at line 5, wherein the process of the recited inventive alignment is described by the specification to present invention in great detail. The Applicant has the right to be his own lexicographer. The MPEP at § 2111.01 states that words within a claim must be given their broadest **reasonable** interpretation (emphasis added). The Applicant respectfully submits that the Examiner's interpretation and treatment of the term aligning as being equivalent to edge enhancement or

shadow reduction is not a reasonable interpretation of the term alignment. The MPEP at §2111.01 further states that words within a claim must be given their plain meaning unless they are defined within the specification. The terms "alignment", "aligned", and "aligning" are clearly given definitions by the specification to present invention. These terms are used extensively throughout the entire specification to the present invention in a manner, which is totally inconsistent with the interpretation of edge enhancement or shadow reduction that has been applied to them by the Final Office Action. The Applicant would like to respectfully point out that the lexicographic determination of claim terms can be a difficult task, but this is not one of those instances where the task is difficult. Simply put, even using the broadest reasonable interpretation of the terms "alignment", "aligned", and "aligning, there is no reasonable interpretation that would construe these terms is being equivalent to either edge enhancement or shadow reduction. Moreover, the specification to the present invention has supplied extensive definition to these terms and the Examiner may not construe these terms in a manner that is wholly inconsistent with that definition supplied by the specification to the present invention.

The Examiner states in Examiner's response to Applicant' s arguments submitted in February 21, 2004 that application of the RANSAC algorithm would be obvious. However, the Examiner has not supported this assertion by explaining how the RANSAC algorithm would be applied within either of the cited references, Frazier et al. or Gupta '121 (U.S. Patent No. 5,848,121). The determination of obviousness requires a suggestion or motivation to be supplied by the cited references and the Final Office Action has not met this requirement.

The Examiner states, with respect to rejected Claim 5 that Gupta'121 teaches that image tiles in the mask and the opacified image may be rotated and translated with respect to each other. The Applicant respectfully points out that rejected Claim 5 recites determining the first alignment approximation including an approximation of at least one of a rotation component and a translation component in the image space of the first and second images. The Applicant respectfully points out that the cited section of Gupta '121 (column 3, line 63 to column for, line 6) does not disclose, or suggest, using a rotation component or translation component to perform any kind of alignment. The cited portion of Gupta '121 simply states that the mask and opacified image may be rotated or translated with respect to each other.

The Examiner argues that because a homographic matrix is well known in the art, its substitution within either of the cited references Gupta '121 or Frazier et al. would have been

obvious to person skilled they art. The Applicant respectfully points out that the suggestion to modify a reference must come from the references themselves and not from hindsight recreation on the part of Examiner. The Final Office Action has not supplied any motivation within the cited references to make the modification suggested by the Final Office Action.

In response to the Applicants arguments that Gupta '121 do not disclose or suggest identifying corners in the images based on intensity changes at that location, the Examiner states that Gupta '121 and column 4, lines 41-46 teaches the limitations recites by rejected Claim 8. The Applicant respectfully points out that rejected Claim 8 recites determining at least one of the first and second alignment approximations by identifying corners in the first and second images based on a determination of Minimum Intensity Changes at the corners. The Applicant would additionally like to point out that the rejection contained in the Final Office Action does not address the term Minimum Intensity Changes at the corners. The cited portion of Gupta '121 discusses locating each pixel in the mask image by displacement given by interpolation to find the location of its corresponding pixel opacified image. The intensity of each pixel in the mask image is then log subtracted from its corresponding pixel in the opacified image. The Applicant does not concur with the Examiner's reasoning that the foregoing section is equivalent to determining and alignment approximation by identifying corners in the first second images based on a determination of Minimum Intensity Changes at the corners.

The Final Office Action rejects claims 1 through 20 are rejected under the provisions of 35 U.S.C. §103 (a) as being obvious over U.S. Patent No. 5,848,121 issued in the name of Gupta et al. (hereinafter referred to as Gupta '121) in view of U.S. Patent No. 5,651,075 issued in the name of Frazier et al. (hereinafter referred to as Frazier et al.).

Regarding Claim 1, the Examiner states that Gupta '121 teaches the recited elements except for the combination of a first and second alignment. The Examiner also states that Frazier et al. illustrates combination of the first and second alignment by applying a Laplacian operator. The Applicant, respectfully, disagrees that the combination made by the Final Office Action results in the invention has recited by rejected Claim 1. The Applicant would like to direct the Examiner's attention to column 5, lines 9-13 of the cited reference, Frazier et al., wherein FIG. 4B and FIG. 4c of that reference are discussed. Frazier et al. clearly states that FIG. 4c is the result of the application of the Laplacian on the license plate image shown in FIG. 4b. There can

be no question that the Laplacian operation performed by Frazier et al. is performed to enhance edges within a single image and not to align different images as asserted by the Final Office Action. Column 5, lines 1-9 of the cited reference, Frazier et al., clearly states that the Laplacian operation is performed to enhance edges. As previously discussed, no reasonable interpretation of the term alignment can be construed as being equivalent as edge enhancement or shadow reduction. Simply put, the Laplacian operation is not performed to align images as recited by rejected Claim 1.

The MPEP at §2143.03 details the requirement to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an independent claim is nonobvious under 35 U.S.C. §103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

The rejection of Claim 1 contained in the Final Office Action recites the elements of rejected Claim 1 and asserts that various portions of the cited references disclose the recited elements. These cited sections do **not** contain all the elements recited by rejected Claim 1. As discussed above, Frazier et al., clearly states that the Laplacian operation is performed to enhance edges. The Final Office Action contends that the Laplacian operation taught by Frazier et al. illustrate the combination of the first and second alignment recited by rejected Claim 1 to the present invention. There is no disclosure, or suggestion, within Frazier et al., of first and second alignments. The Applicant respectfully points out that Frazier et al. do not align two different images. Frazier et al. pertain to a single image that is enhanced. Rejected Claim 1 to present invention recites the "aligning the second image to the first image, based on the first alignment approximation, to form and initially align second image "and "aligning the second image to the first image, based on the combination of the first and second alignment approximations." These elements of rejected Claim 1 are not found in the combination made by the Final Office Action. Accordingly, this rejection is, respectfully, traversed.

Regarding rejected Claim 2 of the present invention that recites the "aligning the second image to the first image based on the combination of the first and second alignment approximations is effected by: aligning the initially aligned second image, which is based on the

first alignment approximation, to the first image, based on the second alignment approximation." The Examiner asserts that these features recited by rejected Claim 2 of the present invention are disclosed by the cited prior art references. The Examiner states that Gupta '121, discloses all the features of Claim 2 except for the combination of the first and second alignment. Specifically, the Examiner states that Gupta '121, at column 2, lines 31-46 discloses the "aligning the second image to the first image based on the combination of the first and second alignment approximations is effected by: aligning the initially aligned second image, which is based on the first alignment approximation, to the first image, based on the second alignment approximation." Gupta '121, at column 2, lines 31-46 discloses match point generation of two-dimensional points in the mask image and their corresponding points in the opacified image. This portion of Gupta '121 teaches the generation of a transformation function and a subtraction algorithm used in the digital subtraction angiography taught by that reference. The Applicant would like to, respectfully, point out that cited section of Gupta '121 does not teach or suggest that the aligning of the second image to the first image is based on the combination of the first and second alignment approximations. This feature is not found in the cited portion of Gupta '121. Moreover, as discussed above, Frazier et al. do not align different images as asserted by the Final Office Action. Frazier et al. enhance a single image. Accordingly, this rejection is, respectfully, traversed.

Claim 3 depends from Claim 1 and further narrows and defines Claim 1. Therefore, Claim 3 is believed to be allowable over the cited references.

Regarding claim 4, The Examiner states that Gupta '121 at column 2, lines 31-46 teaches applying the RANSAC algorithm to determine at least one of the first alignment and second alignment approximations. The Applicant would like to, respectfully, point out that Gupta '121, at column 2, lines 31-46 discloses match point generation of two-dimensional points in the mask image and their corresponding points in the opacified image. This portion of Gupta '121 teaches the generation of transformation function and a subtraction all rhythm used in the digital subtraction angiography taught by that reference. There is no disclosure, or suggestion, within Gupta '121 for implementing RANSAC algorithm to determine at least one of the first alignment and second alignment approximations. Moreover, as discussed above, Frazier et al. does not align different images as asserted by the Final Office Action. The Examiner asserts that the RANSAC algorithm is well known within the art but fails to indicate how the RANSAC

algorithm is taught or suggested within the cited section of Gupta '121. Clearly the RANSAC algorithm is not mentioned in the cited section of Gupta '121. The Examiner has failed to show how the RANSAC algorithm would be applied to either of the cited references. Accordingly this rejection is, respectfully, traversed.

Regarding claimed 5, the Examiner states that Gupta '121, at column 3, lines 63-67 discloses "determining the first alignment approximation includes an approximation of the least one of a rotation component and a translation component in image space of the first and second images." The Applicant respectfully disagrees. Gupta '121, at column 3, lines 63-67 discloses that image tiles within two images can be rotated with respect to each other and that the mismatch arising because of such rotation can be corrected by the two-dimensional perspective transformation on user provided points. There is no disclosure, or suggestion, within Gupta '121 for determining the first alignment approximation using an approximation of at least one of a rotation component and a translation component in image space of the first and second images as recited by rejected Claim 5. Moreover, as discussed above, Frazier et al. does not align different images as asserted by the Final Office Action. Accordingly this rejection is, respectfully, traversed.

Regarding Claim 6, the Examiner states that implementing a 3x 3 homographic matrix to determine the second alignment approximation would the obvious to a person skilled in the art. The Applicant respectfully points out that the Final Office Action has not provided any disclosure or suggestion within the cited references for use of a 3 x 3 homographic matrix. Moreover, the Final Office Action has not indicated how a 3x3 homographic matrix would be used within either of the cited references to determine the alignment approximation. Furthermore, Claim 6 depends from Claim 5, which as previously discussed is believed to be allowable over the cited references, Claim 6 further narrows and defines claim by, therefore, Claim 6 is also believed to be allowable. The Applicant would like to, respectfully, point out that there is no 3x 3 homographic matrix discussed within the cited references.

Regarding Claim 7, the Applicant respectfully points out that the Final Office Action has not provided any disclosure or suggestion within the cited references for use of a 3 x 3 homographic matrix. Moreover, the Final Office Action has not indicated how a 3x3 homographic matrix would be used within either the cited references to determine and alignment approximation. Furthermore, Claim 7 depends from Claim 1, which as previously discussed is

believed to allowable over the cited references, Claim 7 further narrows and defines claim 1, therefore, Claim 7 is also believed to be allowable. The Applicant would like to, respectfully, point out that there is no 3x 3 homographic matrix discussed within the cited references.

Regarding Claim 8, the Applicant respectfully points out that the final office Action cites column 3, lines 44-51 of Gupta '121, however nowhere in the cited section is there any indication of corners in the first and second images least upon a determination of Minimum Intensity Changes in the corners. Also, Claim 8 depends from Claim 1, which as previously discussed is believed to allowable over the cited references, Claim 8 further narrows and defines claim 1, therefore, Claim 8 is also believed to be allowable.

Regarding the rejection of Claim 9 to the present invention contained in the Final Office Action, the Applicant respectfully points out that rejected Claim 9 specifically detect motion by comparing the said align images. The Final Office Action is using a pair of references, neither of which deals with detecting motion by comparing a set of images. The Examiner states that the cited prior art reference, Gupta '121 teaches detecting motion and the recited alignment of images, where in the aligning the first and second images includes a determination of first alignment approximation based on distances at column for, lines 41-46, however, there is no discussion of detecting motion within Gupta '121. Accordingly this rejection is, respectfully, traversed.

Claim 10 depends from and further narrows and defines Claim 9 which is previously discussed is believed to be global over the cited references. Therefore, Claim 10 is also believed to be allowable over the cited references. Accordingly, this rejection is respectfully traversed.

Regarding Claim 11, the Examiner states that Gupta '121 teaches that x-ray images can be seen usually in gray, black or white. The Examiner has taken the position of that gray, black or white as discussed in Gupta '121 can be read on the recitation of "identifying the objects in the set of aligned images based on color matching" as recited by rejected Claim 11. The Applicant respectfully disagrees. Gray, black or white are not colors. Furthermore Claim 11 depends from Claim 9 which as previously discussed is believed to be allowable over the cited references. therefore, Claim 11 is also believed to be allowable over the cited references. Accordingly, this rejection is, respectfully, traversed.

Regarding the rejection of Claim 12, the Examiner states that Frazier et al. alignment by applying a Laplacian operator. As previously discussed, Frazier et al. do not teach alignment by

application of a Laplacian operator but instead teach is enhancement by application of a Laplacian operator. Rejected Claim 12 recites determining a location of the object in each of the set of aligned images and determining a movement of the objects by comparing a location of the object in each image. As previously discussed, Frazier et al. does not have a set a images but only a single image that is enhanced. Accordingly this rejection is, respectfully, traversed.

Regarding Claim 13, the Examiner states that Gupta '121 at column 1, lines 31-37 teaches the step of a motion detecting system. The Applicant respectfully points out that column 1, lines 31-37 of Gupta '121 simply states that while certain types of patient motion can be controlled other types are much harder to control and that in such instances only the opacified images used. The Applicant further points out that the cited portion of Gupta '121 is part of the discussion to the prior art to the invention taught by Gupta '121. The only logical interpretation of this passage cited by the Examiner is that only a single image is used in these instances where there is motion, clearly showing that Gupta '121 does not address alignment of multiple images were motion is involved. The Examiner has attempted to integrate this single mentioning of the word "motion" with the alignment procedures later discussed by Gupta '121 which are intended only for still images. This interpretation application of the term motion is clearly contrary to the manner, which it is used within Gupta '121. The Examiner then renews the assertion and Frazier et al. teach alignment. As previously discussed, Frazier et al. teaches edge enhancement in general reduction and does not align different images as asserted by the Final Office Action. Moreover, neither of the cited references deals with motion. Each of the cited references, Frazier et al. and Gupta '121 teach systems and procedures that only address still images. Accordingly this rejection is, respectfully, traversed.

Claim 14 depends from Claim 13, which is believed to be allowable. Claim 14 further narrows and defines Claim 13, therefore Claim 14 is also believed to be allowable.

Regarding claim 15, which depends from claim 13 in further narrows and defines claim 13, since claim 13 is believed the allowable claim 15 is also believed to be allowable over the cited references.

Regarding Claim 16, the Applicant would like to, respectfully, point out that rejected Claim 16 to present invention recites a memory for storing the representation of a target image and a processor being configured to identify a target within the set of aligned images based on the representation of the target image. The foregoing elements must be taken in conjunction with

Claim 13 from which Claim 16 depends. A memory for storing a representation of a target image and the processor being configured to identify a target in the satellite images are elements that relate to the motion detection system recited by Claim 13. As previously discussed, neither of the cited references addresses motion between multiple images. There is a specific relationship between Claim 16 and Claim 13 from which Claim 16 depends and also between the processor, memory and a target image. This relationship is not mentioned by the rejection contained in the Final Office Action. The Applicant, respectfully, submits that the features recited by rejected Claim 16 are not addressed by the rejection contained in the Final Office Action. Accordingly, this rejection is, respectfully, traversed.

Regarding rejected claim 17 to present invention, Claim 17 depends Claim 16 and further includes the representation of the target image as based on color content of the target image. The rejection contained within the Final Office Action does not invention color content, but instead reiterates the same rejection that was used on numerous of the previously discussed claims. The rejection to claim 17 contained within the Office Action does not address color content. Therefore this rejection is respectfully traversed.

Regarding the rejection to Claim 18 contained within the Final Office Action, the Examiner states that Frazier et al. specifies the movement of an object. The Examiner has used the statements in an attempt to read upon the recitation contained within rejected Claim 18 of determining a location of an objects in each image of a set of aligned images and determining a movement of an objects by comparing a location of the object in each image. As previously discussed, Frazier et al. does not align different images as asserted by the Final Office Action. Frazier et al. only has a single image that is enhanced. Accordingly this rejection is, respectfully, traversed.

Claim 19 depends from Claim 13, which as previously discussed is believed to be allowable over the cited references. Claim 19 further narrows and defines Claim 13. Therefore, claim 19 is also believed to be allowable over the cited references.

Regarding Claim 20, which depends correctly from Claim 19 and indirectly from Claim 13 and further narrows and defines these claims, which as previously discussed are believed to be allowable. Therefore, Claim 20 is also believed to be allowable. Additionally no homographic matrices are discussed in the cited references.

Applicant is not aware of any additional patents, publications, or other information not previously submitted to the Patent and Trademark Office which would be required under 37 C.F.R. 1.99.

In view of the foregoing amendment and remarks, the Applicants believe that the present application is in condition for allowance, with such allowance being, respectfully, requested.

Respectfully submitted,

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